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Oil & Fat Industries

The Technical Journal of the Soap and Edible Oil Trades

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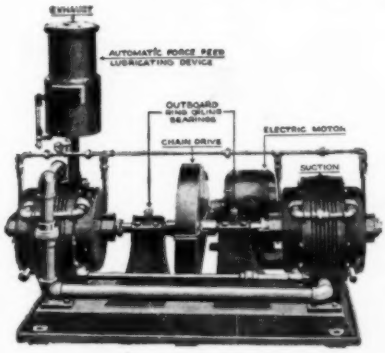

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OIL & FAT INDUSTRIES

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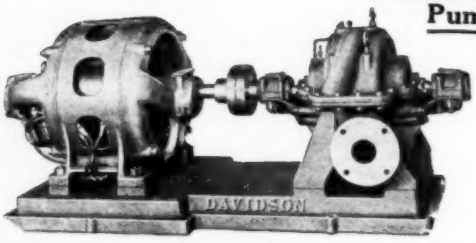

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OIL & FAT INDUSTRIES

VOLUME V JULY, 1928 NUMBER 7

Progress and Poverty

Editorial

NOW that the crushing season has been completed the cottonseed miller is in position to cast up his accounts and determine what the past year (the first under the new Oil-Settlement Rule) has brought him in the way of profit or loss.

We who have advocated the installation of modern oil-handling machinery by the mills for the production of choice product, feel that we have had our position vindicated, even in a season when all the oil produced has been of excellent quality.

Reports which reach us from the crushing territory all show that those millers who have dared to pioneer in the improvement of their product by filtration have each and every one of them completed a successful season, many of them for the first time in years.

While it is true that during the past season of good seed and good oil most crushers have been prosperous, there is not the slightest doubt that the outstanding profits of the season have been made by those who have equipped their mills to take fullest advantage of the premiums now allowed by the rules on better than prime oil.

And what of the future? We will not see choice seed *every* season.

With a large proportion of the mills adapted to produce the better qualities of oil through filtration, what will happen to the laggard who will not progress, who will insist upon marching behind the procession, instead of before, or at least with it.

He at once becomes a member of that unfortunate class of manufacturers who are known as marginal producers, equivalent in industry to the "submerged tenth" in political economy, those who are always struggling for a foothold on life's ladder.

Those manufacturers who are in the marginal class are the first to feel the effects of any business depression, whether confined to their own industry or a general stringency. In such situations the marginal producer is the first to discontinue.

We feel entirely safe in predicting that within a very short space of time, unfiltered crude cottonseed will be an unsalable commodity in the United States.

How will this affect *YOUR* profits?

Suitable Soaps For Silk Mills

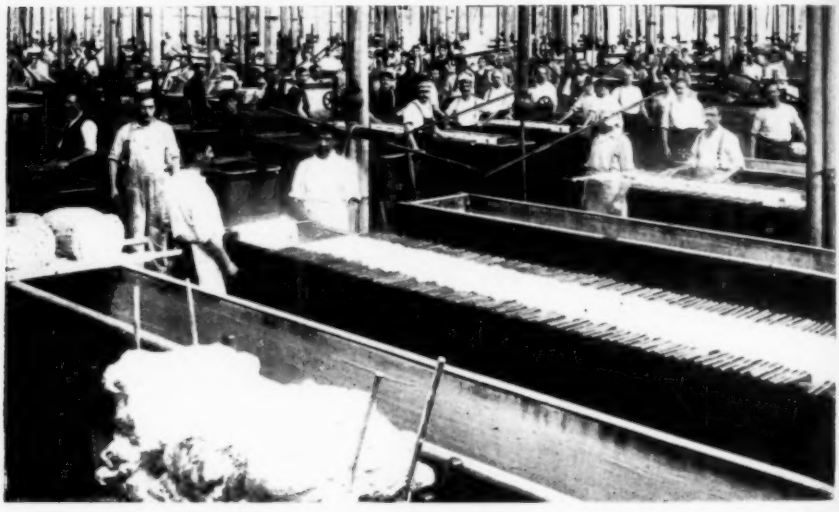
By FRED. GROVE-PALMER, A. I. C.

DURING the course of many years' experience in the laboratories of silk mills, the writer has been called upon to examine a great number of samples that have been offered for sale for the various purposes that entail the employment of soap in the treatment and finishing of the "Queen of Fibers." Soaps of all kinds have been tested and analyzed and the great majority have been found to be totally unsuited for the purpose.

It has been ascertained that no soap which has a hard fat for its base may safely be used for the "boiling-off" of silk, and the same remark applies to a soap which is of such a constitution that a solution of one per cent in water will set to a jelly when it cools. In addition, the use of any soap that contains rosin or colophony in its make-up is absolutely prohibited.

The presence of rosin is injurious to silk because it produces a yellowing of the fiber and that coloration is exceedingly difficult to remove; in many cases it has proved to be impossible to get it out without risking damage to the luster of the silk and so spoiling its commercial value entirely.

As regards the two other prohibitions, it may be wondered why so much stress has been laid on the necessity for choosing only soaps to which they do not apply. The reason is this: silk is covered with a coating of a substance known as sericin or silk-gum, and this must be removed before the fiber can assume that soft, crisp feeling with which we associate the word "silkiness." The best and cheapest method of removing the sericin is by boiling-off or degumming in a hot solution of soap; when that has been accomplished the silk



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Stripping and Dyeing Silk

must be washed quite free from soap before it is dyed or weighted, otherwise there is danger of getting irregular white patches called "soap-marks." Now, although the washing of the boiled-off silk is usually conducted with extreme care and in thoroughly well-softened water, in the ordinary rush and worry of a busy mill there is the danger of an occasional slip-up in this respect and there may be times when the silk is not properly rinsed free from soap. If this should occur and a soap is being used that will set to jelly or has been made from a hard fat, once it has become fixed in the fiber it is exiremely difficult to get it out and it might give rise to trouble in the subsequent operations. Therefore the soap that is used must be free from such chances.

Experience has taught the sad knowledge that a silk factory should not buy a soap on the word of the salesman; either through a wish to deceive or through sheer ignorance soaps often have been presented as being free from rosin when it was obvious to the trained eye that rosin was present, and there are many other cases when it was not visible but was found by analysis. After all there is no need for it, as rosin is added merely as an adulterant to cheapen the commodity. There is not so much need for that in the silk industry as there may be in others; the finest fiber requires the finest materials for working it.

Extended research has shown three different kinds of soap that have proved themselves to be excellent for the purpose of boiling-off silk and also in the various other processes that the silk must pass through in the finishing departments. The first of these, and one of which many hundreds of tons have been used is a pure oil soap; the analysis of it is approximately:—

Fatty anhydrides	65%
Combined alkali	8%
Free alkali	0.3% or less
Water	23%

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Finishing skeins of silk after weighing and dyeing

The low figure of the free alkali is an important matter in choosing a soap for use in this connection, because the presence of any great quantity of alkali is detrimental to the luster of the silk, and in excess at the temperature demanded by the boiling-off process it may actually lead to the tendering of the fiber by dissolving the silk-substance (fibroin) itself. The fat in this particular variety of soap is of semi-solid order, but a solution of one per cent shows no signs of jellying up when it is cooled. It is therefore very easy to wash it out, and even in cases where the rinsing has been scamped either because of lack of time or because the supply of softened water has been running low, there was no risk of leaving soap settled in the interstices of the fibers. In a factory run by supermen this could never happen, but with the average human beings most frequently employed in silk mills, it does, and therefore all precautions must be taken to nip such errors in the bud before they are perpetrated.

Monopol Successful

A soap that has been used with great success is Monopol soap; this is possibly a proprietary article or a patented name for soaps made of sulphonated castor or linseed oil. Whether the brand that was used was the product of the patentees or whether it was some other make was never really known, as the merchant who supplies it was somewhat reticent on the subject for a number of reasons. The analysis of this showed the following:—

Fatty anhydrides	65-70%
Combined alkali	3%
Free alkali	nil
Water	12-15%

At the time we were not able to get extensive supplies of this soap and as the price was very high the use of it was eventually dropped, though the dyers were very loud in its praises. There was no free alkali, as will be seen from the figures quoted, and the small quantity of water made less of the soap requisite; it needed less rinsing and was altogether desirable.

Marseilles Best

Without doubt the best of all soaps for the use of the silk dyer and finisher is Marseilles soap, or as it is often called, "Green Olive Oil soap," and it is interesting to remember in this respect that from earliest times when silk was being degummed in Europe the people always used olive oil soap for the purpose. This is just another instance of the exceeding wisdom of the ancient people in choosing the best thing for a particular purpose, and of our scientific knowledge proving the correctness of their views.

The main bulk of the Marseilles soap that comes into the markets of the world is shipped from the French port that has given it its name; but it may be purchased from both Spanish and Italian makers. It is produced in the olive growing countries on the borders of the Mediterranean Sea, but some is made in our own country, and if it were better known to the modern silk industry the call for it would be considerably greater.

The following figures show an approximation of its constitution:

Fatty anhydrides	60-63%
Combined alkali	7%
Free alkali	not over 0.3%
Water	26-30%

Marseilles soap is excellent in every way for the purposes of the

silk mill, and the price is generally low enough to make it a pleasing proposition; the fat is always liquid because manufactured from the final extractions of oil from the olives after the qualities that are required for food and similar purposes have been extracted. It was quickly found that this soap had another reason for its popularity in the factory and that was that the girls employed there soon discovered its value in preserving "that schoolgirl complexion." It is a fine green color, which is derived from the chlorophyll present in the fruit, and it appears to be good enough to eat, which is a fact that the soap-maker should always keep in his mind when turning out a product. The saying that "an article is sold the first time on its appearance and the second time on its quality" is very true of soap.

Marseilles soap is generally boiled from the olive oil foots that have been extracted from the press-cake and crushed kernels by means of such volatile solvents as carbon disulphide and ligroin (a very light gasoline). The solvent is then distilled off and used again for a fresh lot. There are grades of olive oil soap that have not this same green color and that have been tested out in the same way as the others; they are equally suitable, but the less pleasing appearance renders them unpopular with the dyers, and there is always a need to retain the liking of the dyer for the material he is using as otherwise he is apt to lay the blame for everything that goes wrong on the substance of which he does not quite approve. While the superintendent does not pander to this recklessly, at the same time for the sake of a peaceful life he pays considerable attention to it.

These brown olive oil soaps are manufactured from a mixture of the green olive oil foots and "red oil"; this latter is the substance that is known to the chemical technologist as "crude oleic acid." It is made in the course of the manufacture of stearin; the fat, most frequently palm oil, is boiled up with lime, and the "rock," that is, the solid salts of calcium formed in this way, is cooked with dilute sulphuric acid. By this reaction calcium sulphate is precipitated, and

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Reeling Machines in a Silk Mill

the fatty acids are set free; they are run off and on cooling set into cakes of suitable size. The cakes are subjected to hydraulic pressure by means of which a certain amount of liquid is squeezed out, which is the "red oil" and that is of considerable value to the soap-maker.

McQuillin has described what is perhaps one of the best processes for the production of a brown olive oil soap for silk, which may be summarized here for the benefit of those who may not have read it before:

Heating with Steam

The soda lye of 30 deg. Bé, is put into a clean kettle and heated with open steam to near boiling; the red oil is baled in or run in from a barrel through a pipe of one-and-a-half-inch diameter. It should not be allowed to go in too quickly, for it may lower the temperature so much that there will be a bunching, which should be avoided; the open steam will keep up a continual agitation of the mixture in the kettle. Always there must be sufficient lye present to keep it open throughout the whole of the early stages of the operation. As soon as the whole of the red oil is in and has been well saponified the olive oil foots may be put in together with some weaker lye of 20 deg. Bé. During the whole of this part of the work the soap should be tested by its bite. A small portion of the mixture is taken between the thumb and finger and when it has cooled it is tasted by the tongue; so long as the business is proceeding properly there will be a sharp taste, and if this is the case there is no longer a need to keep it open.

When about ninety per cent of the olive oil foots is in, the open steam is shut off and closed steam continues the heating for fifteen minutes or so, and if there is still a bite the remainder of the oil is added together with a quantity of salt sufficient to open the soap. If it is properly relarged a clean paddle dipped into it and held at an angle will show grains of soap and the clear lye running down its surface.

The open steam boil is then turned on again until such time as the volume of the liquid has increased to the extent that the kettle is full, when it is shut off and the soap allowed to settle for three hours; the soap rises to the top and the salty lye sinks, to be run off into the settling tank from which a small quantity of soap is subsequently collected. The main bulk of soap is boiled up again with water to clear out the salt and a fresh small lot of the weaker lye is added to make quite sure that any last traces of oil are completely saponified. This strengthening change opens the soap and it is once more boiled to the top of the kettle to be allowed to settle again overnight. The second lye must then be run off and the soap gets a cleansing boil with plain water, after which it must stand for at least twenty-four hours, and when the wâter has been run off, the soap is pumped through the swing-pipe to the frames. It is particularly emphasized that as the pipe gets close to the surface of the nigre the lowering should be done carefully and slowly.

Olive Oil Foots Added

The strengthening lye and nigre have added to them a small quantity of olive oil foots and the whole is boiled up so as to make sure of losing no soap that way. This soap is left in the kettle when the next

batch is started, allowance being made for the space it will occupy. The figures given run as follows:

For a kettle of 2000 gals. the first charge would be 4500 lbs. of mixed oils which will give enough soap to fill six one-thousand pound frames. The formula is:—

Lye of 30 deg. Bé.....	1500 lb.
Red oil	2250 lb.
Olive oil foots.....	2250 lb.
Lye of 20 deg. Bé.....	2300 lb.

That is stated to be sufficient to saponify all the oil completely.

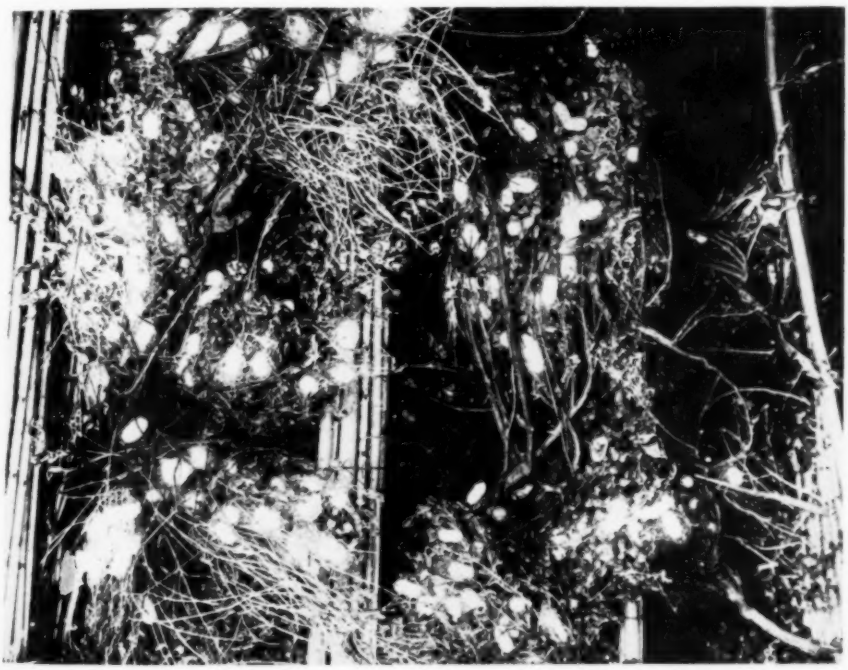
For the boil on Nigre:—

First lye	1325 lb.
Red oil	2000 lb.
Olive oil foots.....	2000 lb.
Second lye	2100 lb.

This is specifically for making a soap with fifty-fifty of the two oils, but when the olive oil foots is in the majority the procedure is slightly altered. In such a case it is advisable to boil the foots first wth the weaker lye in the proportion of 1000 lbs. of oil to 1100 lbs. of lye, and when that has been properly saponified the red oil may be put in, always keeping the lye in excess to preclude the possibility of the mixture bunching. An addition of salt assists in this. Apart from these details the procedure is as already noted.

It is pointed out that the ordinary kettle with only open steam coils will not do, there must be closed ones as well.

There is another stage in the life of silk in the silk mill when soap is required, and so far from this having anything to do with the finishing, it may be regarded as



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Cocoons of the Silkworm, Syria

the starting of all the operations, other than purely financial ones, that take place when the hanks of raw silk come into the hands of the manufacturer; this is the preliminary soaking.

Experiments had shown that the green olive oil soap was as good as any other for the first soaking of the skeins, but we were always up against tradition. Although no faults were to be found with the green soap, from time immemorial it had been customary to use a curd soap; the people were used to it; nothing ever went wrong; the same firm had been supplying it since grandfather's day and the ancestors of the operatives had bred it into the blood of their children, and so on. There was no use fighting it; the only thing to do was to watch closely, for, of course, owing to the fashion in which a curd soap is made, there is always a larger amount of alkali present than in other soaps and it only needed a small slip-up to make things really serious.

Silk Broke

As a matter of fact there was such a happening. A lot of silk recently soaked was giving trouble in the works by constantly breaking; previous batches from the same shipment had been good, there had been no fresh lot of soap received and the present lot had been passed as fit for use by the chemists. It looked like being one of those mysteries that the operatives thoroughly enjoy; everything perfectly normal and yet the result absolutely wrong. The matter was far too important to be passed over lightly, and eventually it was found that a fresh case of soap had been opened for this particular lot of silk. By good luck some of the bars in the case still remained. On examining these they were found to be coated with a layer of crystals of soda and on looking at some more boxes others were found in the same condition. Those cases which had been tested by the laboratory had been quite satisfactory; the shipment was a mixed one. Naturally the soapmaker heard something of the matter and gave a totally unsatisfactory explanation of the occurrence. The loss was really serious to the silk people, for it meant not only scrapping very valuable material but a most annoying delay in output; silk is not merely silk, it is generally a particular sort of silk and is not always waiting on the doorstep to be purchased.

Curd Soap Analysis

A typical analysis of curd soap may be taken as being:

Fatty anhydrides	66.6%
Combined alkali	7.5%
Free alkali	0.5%
Water	23.8%

It will be seen that with so much free alkali, there need not be a very great error in the making to throw the figure out of bounds altogether.

It will perhaps be suggested that curd soap, in view of the foregoing remarks about liquid fat and low alkali, is not a satisfactory one to use with silk; it would not be possible to use it for degumming, where the solution containing the silk is kept at the boil for a long time, but in the preliminary soaking the object is entirely different and the process is also. Instead of softening the sericin and dissolving it off the fiber, as in boiling-off, it is only required to soften it slightly so that the hard places which have arisen in the course of reeling it off the cocoons may be softened sufficiently to en-

able the skeins to be unwound easily. Instead of having to wash out the soap so as to permit of such operations as weighting and dyeing, the soap does not have to be removed, indeed a certain amount of it, together with other greases that are put in the soaking bath, are purposely left on in order to act as lubricants to the silk in its passage through the various machines for throwing, winding, warping, weaving, etc. And finally, instead of boiling in it, the silk is merely allowed to lie in the bath at a very low temperature.

It will be gathered from the details here collected together that the soap-maker has a very important part to play in the manufacture of silk, and it calls upon him for the exercise of continuous care and judgment in seeing that his products are always up to the very high standard that must, perforce, be set in dealing with such a valuable commodity.

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Avocado Oil

The Composition and Constants of a Little-Known Pericarp Oil

BY GEORGE S. JAMIESON, W. F. BAUGHMAN AND RAYMOND M. HANN

AVOCADO growing[1] is one of the minor industries of California and Florida. One of the problems of this industry is to find use for the large quantities of cull fruit which at present go to waste. Incidentally, large quantities of this fruit are produced in certain regions of the West Indies, Central America, and tropical South America, from which it is not feasible to ship the fruit in fresh condition to northern markets. With this in view, the authors have made an investigation of the fatty oil contained in the pulp of the fruit.

The edible portion or pulp of the different varieties of avocado grown in California constitutes from about 68 per cent to 85 per cent of the fruit at maturity.[2] This pulp is rich in fat, some varieties containing, on a water-free basis, at least 70 per cent of this constituent. The large seed of the fruit contains very little oil, an air-dried crushed sample of seed contained only 2.2 per cent of oil.

Extracted by Ether

The oil has been extracted with ether from several samples of dehydrated avocado pulp and expressed from several other dehydrated samples by E. M. Nelson of the Protein Investigation Laboratory. Previous attempts to express the oil from the fleshy portion of the avocado gave only a stable emulsion of oil and juice, consequently it it necessary to dehydrate the pulp before it is pressed. In all cases the oil was dark green by transmitted light and red by reflected light, but the expressed oil was lighter in color than the extracted oil. The expressed oil had but little odor and a pleasant fruity flavor and probably could be used as a commercial edible oil if it were not for its color. A sample of the ether-extracted oil was refined by the caustic soda process and bleached with 6 per cent fuller's earth. The resulting product was considerably lighter in color, but it still had too dark a greenish hue to be used as a commercial edible oil. A boiled settled soap made from the crude oil by R. S. McKinney of this laboratory was of moderate hardness. It had a pale green color but on exposure to sunlight for three or four days the surface of the soap bleached to a cream color. This experiment shows that the oil could be used in combination with other fats for the manufacture of hard soap.

Kept for Year

The oil has good keeping qualities. Several samples of the crude oil were kept in partly filled bottles on a laboratory table for a year. They were low in acidity

[1] C. G. Church and E. M. Chace, "Some Changes in the Composition of California Avocados During Growth," U. S. Dept. of Agri. Bull. No. 1073; Wilson Popenoe, "The Avocado in Guatemala," U. S. Dept. of Agri. Bull. No. 743.

[2] C. G. Church and E. M. Chace, ibid.

when first extracted (7), being around 1.0 in acid value (1 mg. of KOH was required to neutralize the free fatty acids in 1 gm. of oil), and their acidity did not increase much. The acid value of one sample at present is 3.0, having increased two units, but the acid values of the other samples increased only 0.2 or 0.3 of a unit. They show no symptoms of rancidity.

Chemical Composition

The chemical composition of a sample of the oil extracted with ether from the dehydrated pulp of the Fuertes variety of avocado has been determined, and is reported below. The more important chemical and physical characteristics of this oil are recorded in Table I. The percentages of saturated and unsaturated acids were determined by the lead salt-ether method,[3] and corrections were made for the small quantity of unsaturated acids that separates with the saturated acids fraction. It was also taken into account that the unsaponifiable matter separates with the unsaturated acids fraction.

The iodine number of the unsaturated acids fraction is 101.2, indicating that this fraction consists of oleic acid (iodine number 90.1) and linolic acid (iodine number 181.4). The following percentage composition of the unsaturated acids fraction was calculated from these figures.

	Per cent.	In original oil Per cent	Glycerides in original oil Per cent
Oleic acid, ..	87.8	74.0	77.3
Linolic acid,.	12.2	10.3	10.8
	100.0	84.3	88.1

[3] J. Am. Chem. Soc., 42, 2398 (1920): Cotton Oil Press, 6, 1, 41 (1922).

The saturated acids were separated from the oil by the lead salt-ether method and esterified with methyl alcohol. This mixture of methyl esters, which weighed 102.2 gm., was fractionally distilled under diminished pressure. The data for the distillation are given in Table II. The preliminary distillation was made from a 1-liter Claissen flask and divided the mixture into five fractions and a residue. These were redistilled from a 250-cc. Ladenburg flask according to the manner indicated in the table. Five final fractions were obtained.

The iodine numbers and the saponification values of these five final fractions were determined and are recorded in Columns 2 and 3, Table III. The small final residue consisted of decomposition products and was disregarded. The iodine numbers are measures of the contaminating unsaturated acids, and from these values the percentage of unsaturated acid esters in each fraction was calculated. From these percentages and the saponification values the mean molecular weights of the saturated acid esters in the different fractions were calculated as recorded in Column 6.[4]

Results Indicate Esters

The results in Column 6 indicate what saturated acid esters may be present in each fraction. Thus, the mean molecular weight of the saturated acid esters in fraction 1 lies between the molecular weights of methyl myristate (242.3) and methyl palmitate (270.3), and suggests therefore that this fraction contains these two esters. The results for fractions 2, 3 and 4 suggest that these

[4] J. Am. Chem. Soc., 42, 152, 1197 (1920).

fractions are composed mostly of methyl palmitate, but contain also small portions of methyl sterate (298.4). The indicated saturated acid esters in fraction 5 are methyl stearate and a small amount, less than 1 per cent, of methyl arachidate (326.4).

Recover Fatty Acids

In order to test the correctness of these deductions, the free fatty acids were recovered from some of these fractions by saponifying with alcoholic potash and decomposing the soap solution obtained with hydrochloric acid. The constituent saturated acids were isolated by fractional crystallization from ethyl alcohol. Their identities were established by determining the melting points and by observing whether or not these melting points were lowered when the substances were mixed with equal quantites of the respective acids which they were suspected of being, the purity of which had been established previously by elementary analyses.

The deductions drawn from the mean molecular weights were confirmed as follows: Arachidic acid, $C_{20}H_{40}O_2$, melting at 77° was isolated from fraction 5. Portions of stearic acid, $C_{18}H_{36}O_2$, identified by the melting point 68-69°, were obtained from fractions 5 and 4. As was to be expected, it was not difficult to obtain pure palmitic acid, $C_{16}H_{32}O_2$, melting at 63°, from fractions 4 and 1. On account of the solubility of myristic acid, $C_{14}H_{28}O_2$, in alcohol and the large quantity of palmitic acid present, it is not surprising that it was not possible to separate this acid in a pure condition from fraction 1. Seven crops of crystals were obtained from the alcoholic solution of fraction 1 by gradually evaporating the alcohol and adding water. The melting point of the small seventh crop was 56-57°, and since the melting point of pure myristic acid is 54-55° it was considered to be a mixture of myristic and palmitic acids.

The quantities of saturated acids in the various fractions were calculated from the mean molecular weights of their esters (Columns 6, Table III) and the theoretical molecular weights of the two esters in each fraction. The results are given in Column 7-14, Table III.

In Table IV the percentage composition of the saturated acids is given in Column 2. These values have been calculated to the basis of the original oil and are recorded in Column 3. In Column 4 are the equivalent percentages of glycerides.

Summary

It may be possible to utilize the cull avocado fruit, which at present goes to waste, by making use of the fatty oil contained in it. This oil probably would not find a market as an edible oil on account of its color, but experiments have shown that it would be valuable for the manufacture of soap. The composition of this oil has been determined and is recorded below.

	Per cent
Glycerides of:	
Oleic acid	77.3
Linolic acid	10.8
Myristic acid	trace
Palmitic acid	6.9
Stearic acid	0.6
Arachidic acid	trace
Unsaponifiable matter	1.6

TABLE I

Avocado Oil

Chemical and Physical Characteristics

Specific gravity $\frac{25°}{25°}$	0.9132
Refractive index 20°	1.4700
Acid value	2.8
Saponification value	192.6
Unsaponifiable matter (per cent)	1.6
Iodine number (Hanus)	94.4
Acetyl value	9.2
Reichert-Meissl number	1.7
Polenske number	0.2
Saturated acids (corrected) (per cent)	7.2
Unsaturated acids (corrected) (per cent)	84.3
Iodine number of unsaturated acids	101.2

TABLE II

Avocado Oil

Fractional Distillation of Methyl Esters of Saturated Acids
(102.2 g. subjected to distillation)

	Fraction	Temperature °C.	Weight Grams
(Preliminary distillation under 15 mm. pressure)	A	192	20.0
	B	192–3	24.0
	C	193–4	23.52
	D	195–9	23.20
	E	200–15	7.44
	Residue		3.84
(Final distillation under 2 mm. pressure)			
Fractions A and B added	1	154–5	11.00
Fractions C and D added	2	155	46.80
Fraction E added	3	156–7	24.00
	4	157–164	12.50
Residue added	5	178–205	7.27
	Residue		0.34

TABLE III

Avocado Oil

Results of Analyses of Fractions Obtained by Distilling Methyl Esters of Saturated Acids

Fraction	Iodine Number	Saponification value	Mean molecular weight	Esters of unsaturated acids	Mean Molecular weight of esters of saturated acids	Myristic Acid		Palmitic Acid		Stearic Acid		Arachidic Acid	
				Per cent		Per cent	G	Per cent	G	Per cent	G	Per cent	G
1	3.7	208.2	269.4	3.84	268.5	5.82	0.64	85.32	9.39	....	....	....	....
2	6.2	205.9	272.5	6.43	271 0	....	....	86.51	40.49	2.22	1.04	....	....
3	10.2	205.0	273.6	10.58	271.1	....	....	82.37	19.77	2.43	0.58	....	....
4	22.4	202.7	276.8	23.24	271.4	....	....	69.94	8.74	2.86	0.36	....	....
5	36.8	188.5	297.6	38.17	298.6	....	....	.....	.....	58.51	4.25	0.42	0.03
							0.64		78.39		6.23		0.03

TABLE IV

Avocado Oil

Saturated Acids

Acids	Acids in saturated acid fraction Grams	Per cent	Acids in original oil Per cent	Glycerides in original oil Per cent
Myristic	0.64	0.75	.05	trace
Palmitic	78.39	91.91	6.62	6.9
Stearic	6.23	7.30	0.53	0.6
Arachidic	0.03	0.04	trace	trace
	85.29	100.00	7.20	7.5

Recommends Benzoate Test for Olive Oil

The Olive Oil committee of the American Oil Chemists' Society, headed by Louis M. Roeg, chief chemist for Brewer & Company, Worcester, Mass., recommended to the recent convention of the Society the use of the silver benzoate method for testing olive oil extracted by carbon disulphide. During the year the committee members tried other methods, but came to the conclusion that the silver benzoate one shows the best reaction. Extracts from the committee's report follow:

Problem Stated

"On October 25, 1927, the chairman of the committee sent to its members a statement of the problem, saying that it was necessary to detect in edible olive oil the small quantities of extracted olive oil containing sulphur from the carbon disulphide solvent, and that his own laboratory had tried the three methods for doing this that were outlined by Mr. F. Lauro in the September, 1927, issue of OIL AND FAT INDUSTRIES.

"These three methods are the coin test, the acetic-anhydride test (Italian test of Pachini or Bracci), and the silver benzoate test. The following results were noted:

"Coin Test: With 100 per cent extracted olive oil, a shiny new dime was very definitely blackened. With ten per cent extracted oil and ninety per cent edible olive oil by volume, the dime was not blackened to an appreciable extent.

Acetic Test

"Acetic-Anhydride Test: With 100 per cent extracted olive oil, a definite, rosy-red coloration was secured. With ten per cent extracted oil and ninety per cent edible olive oil, a slight pink coloration was noticed. This shows a better reaction than under the coin test.

"Silver Benzoate Test: For this test we make the silver benzoate from silver nitrate and sodium benzoate by precipitation from hot aqueous solutions. After cooling, washing with cold water and drying, twenty milligrams of silver benzoate were added to five cc. of mixed olive oils and the mixture heated to 150 degrees C. in an oil bath. With ten per cent extracted oil and ninety per cent edible oil, a dark brown coloration was obtained. With five per cent extracted oil and ninety-five per cent edible oil, a brown coloration about half as dark as the first was

secured. With one per cent extracted oil and ninety-nine per cent edible oil, a definite brown coloration, distinctly different from 100 per cent edible olive oil, was produced.

"These results were secured in the laboratory of the chairman of the committee. The results were sent to all members of the committee with instructions to make similar tests on samples of extracted and edible oils mailed to them. On October 31, G. S. Jamieson stated that he supposed that the sample marked 'extracted oil' had subsequently been refined, basing his opinion on its light color. Others including the chairman are of the same opinion. This is an important point, for it shows that a light colored (and probably refined) olive oil extracted by carbon disulphide makes a definite brown coloration with silver benzoate, even with one-half of one per cent extracted oil and ninety-nine and one-half per cent edible oil.

"W. H. Dickhart in his letter of December 29, 1927, stressed that the above three tests when applied to olive oils extracted by carbon disulphide show that silver benzoate is a more definite reagent than the Italian acetic-anhydride test, but that the latter test will act positive with oils extracted by other solvents, whereas silver benzoate fails with oils extracted by solvents other than silver benzoate. However, since the majority of commercial oils are extracted by carbon disulphide, we shall continue this report as per our original problem.

"On January 31, M. L. Sheeley sent his results from the use of the three tests, and since they also agreed with the conclusions of the others, the committee recommends that the silver benzoate test be adopted for testing olive oil extracted by carbon disulphide."

Jackson Becomes Sales Manager for "Purit"

THE Purit Company, Amsterdam, Holland, manufacturers of "Purit" activated carbons, and the Glidden Food Products Company, United States Depository Agents for "Purit," announce the appointment of A. A. Jackson as General Sales Manager. Mr. Jackson's headquarters are at 82 Wall Street, New York, with the Glidden Food Products Company.

Mr. Jackson has been closely identified with the activated carbon business for the past several years and enjoys a wide personal acquaintance with the consuming trades in this line throughout the country. He has returned recently from an extensive visit with his principals in Holland, during which arrangements were completed for carrying in stock at convenient American distributing points a new grade of decolorizing carbon in addition to the regular grades heretofore handled.

Society Gains 55 New Members

GROWTH of the American Oil Chemists' Society is shown by the report of the Membership Committee at the recent convention held at New Orleans. During the past year fifty-five new applicants were submitted to the Society by the Committee, which is composed of Miss Rosalind U. Norris and Messrs. W. G. McLeod, P. W. Tompkins, L. C. Howe, W. A. Peterson, and A. W. Putland. That this growth was due to "recognition and approval of the Society's work and activities" rather than to the efforts of the Committee was expressed.

Detergent Experiments on Cotton

Evaluation of Washing Media for Goods Soiled with Oiled Lamp Black

BY ROBERT M. CHAPIN *

FOLLOWING detergent experiments on cotton soiled with non-oily carbon black,[1] similar work has been done on cotton soiled with oiled lamp black. The latter substance was chosen because it was more finely divided than the carbon black at hand, the fact that it was originally oily making no difference in this case.

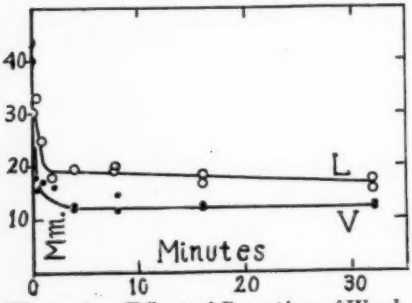

Figure 1.—Effect of Duration of Washing in Experiment 1 on Soil Compounded with Lard (Curve L) and with Vaseline (Curve V).

New cotton poplin (Burton's Irish Poplin) was given a preliminary washing as before, but this time the material was cut perpendicularly to the selvage into strips three-fourths inch wide and was not ether-extracted before soiling.

The soil was applied in ointment form, that is, as a paste stiff enough not to flatten on standing, made by thoroughly incorporating sufficient lamp black into the chosen vehicle. A 9-inch strip of the goods was laid on plate glass and completely covered with ointment, liberally smeared on with a spatula, then most of the excess was scraped off with a firm pressure on the tilted spatula blade. Next the strip was turned over and treated in the same way on the other side. The glass plate was kept fairly clean by scraping with the spatula. After a sufficient number of strips had been thus treated the plate and spatula were thoroughly cleaned with paper towelling and kept clean thereafter while the strips were again scraped on both sides

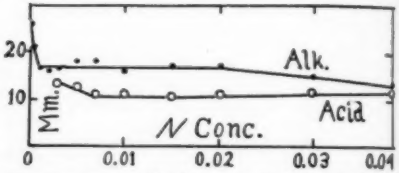

Figure 2.—Alkaline and Acid Sodium Palmitate at 65° C. against Vaselined Soil in Experiment 2.

to remove excess ointment, either directly by the spatula or by adherence to the glass plate. Next, each was drawn once or twice from each end through a firmly held fold of clean paper towelling. Finally they were laid smoothly on a sheet of glass, left in an oven at 100°C. for one-half hour and then kept at room temperature for at least one hour before use.

Heated Sufficiently

The washing was conducted in the same machine and manner as

* *Biochemic Division, Bureau of Animal Industry, U. S. Department of Agriculture.*

[1] O. & F. Ind. 5 95 (1928). In that paper as printed the cuts for Figures 7 and 8 should be reversed.

previously described, except that the soap solutions were heated only sufficiently to insure complete solution and mixing, and were left in the bath for only three-fourths hour before use. The soiled strips, after rejection of one-half inch at each end, were cut into 2-inch lengths. Each resulting slip was provided with a lead weight and inserted into a clip of the machine. After washing, the residual stain

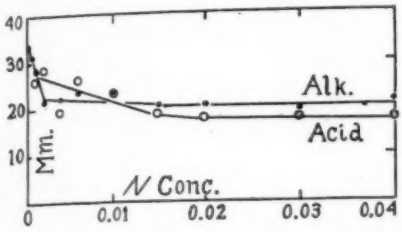

Figure 3.—Alkaline and Acid Sodium Palmitate at 65° C. against Larded Soil in Experiment 2.

was compared in the same colorimeter and against the identical standard used in the work on carbon black.

To insure a soil that would surely remain uniform the first preparations employed a greasy vehicle, either yellow vaseline or high-grade lard. In a stout 150 cc. beaker provided with a thick glass rod, ten grams of the black were thoroughly mixed with fifty grams of the vehicle by alternate periods of heating in an oven at 100°C. and stirring when cool enough to handle. When a perfectly smooth paste had been obtained the beaker was set in cold water and the contents were continually stirred until well stiffened, after which a spatula was employed. The finished ointment was left at least one hour at room temperature before use and was always freshly worked with the spatula before application.

Experiment 1.—The first experiment dealt with the effect of duration of washing at 75°C. in 0.03

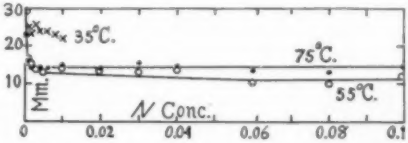

Figure 4.—Neutral Sodium Palmitate against Vaselined Soil at Various Temperatures in Experiment 3.

N neutral sodium palmitate, with a 4-minute rinse in distilled water. The results are given in Figure 1. For all subsequent experiments the wash period was eight minutes and the rinse four minutes.

Experiment 2.—The relative powers of alkaline and acid sodium palmitate at 65°C. were compared, with the results shown in Figure 2 for vaselined black and in Figure 3 for larded black.

Experiment 3.—The effect of variation of temperature upon the power of neutral sodium palmitate upon vaselined black is shown in Figure 4.

Experiment 4.—Results upon vaselined black with neutral sodium laurate at 75°C. and with neutral sodium oleate at 35°C. are given in Figure 5.

The larded black usually was more resistant than the vaselined. Both however, were more powerfully removed by acid soaps than by alkaline ones. The writer[1] has noted a similar order in the powers of acid and alkaline soaps to emulsify oils and to deflocculate oily black, an order the reverse of that of their powers to deflocculate naked carbon black and to cleanse goods soiled with that substance.

Properly to compare soaps at different temperatures it seemed

[1] O. & F. Ind., 4 15 (1927).

necessary to use in the soil a vehicle which should be of nearly uniform consistency throughout the temperature range. Hence a soil was

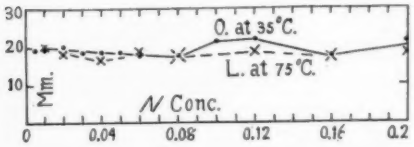

Figure 5.—Neutral Sodium Laurate at 75° C. (Curve L) and Neutral Sodium Oleate at 35° C. (Curve O) against Vaselined Soil in Experiment 4.

compounded from lamp black, fifteen grams, and laxative mineral oil, fifty grams, in a manner similar to the preceding except that heating seemed unnecessary. Though it formed a softer paste it did not flatten on standing.

Experiments 5 to 8.—Results with various neutral sodium soaps at 20, 40, 60 and 80° C. are given in Figures 6 to 9. Stoppage of a curve short of the limit of 0.2 Normal indicates that the next higher

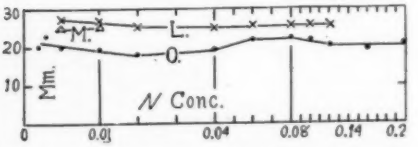

Figure 6.—Neutral Sodium Laurate (Curve L), Myristate (Curve M) and Oleate (Curve O) against Oiled Soil at 20° C. in Experiment 5.

concentration tried proved too thickly laden with crystals to be workable. These experiments well bring out the importance of selecting soap appropriate for the particular temperature at which the washing is to be conducted. Sodium oleate was unrivalled up to 40° C. At 60° C. palmitate slightly surpassed oleate and took first place, that temperature being a little too low for stearate to function successfully. At 80° C. stearate became decidedly the superior.

These detergent tests were obviously less sensitive to changes in the temperature and composition of the soap solutions than were the emulsification tests previously described. Also, ocular evidence of this dissimilarity frequently appeared during the work. In certain runs on some soaps it was noticed that different concentrations showed conspicuous differences in the degree of dispersion of the oily black in the residual solutions and in the cleanliness of the brass clips

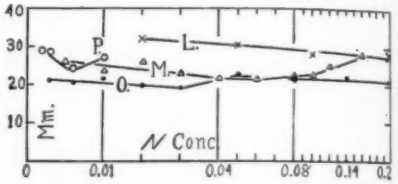

Figure 7.—Neutral Sodium Laurate (Curve L), Myristate (Curve M), Oleate (Curve O) and Palmitate (Curve P) against Oiled Soil at 40° C. in Experiment 6.

on removal, without such differences being more than faintly, if at all, reflected in the relative cleanliness of the slips. The acid soaps, of course, effected a finer dispersion of the soil and left the clips much cleaner than did the corresponding alkaline soaps.

For comparison with the results of the straight washing experiments some special trials were made of other methods.

Experiment 9.—Inasmuch as neutral gelatin had shown[1] notable deflocculating power against oiled carbon black, the detergent power of a six per cent solution at 55° C.

[1] Ind. & Eng. Chem., 19, 1275 (1927).

was tested upon vaselined black with the results shown in Table 1. It was therefore decidedly inferior to sodium palmitate at that temperature.

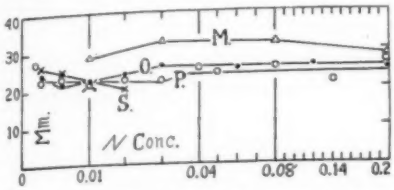

Figure 8.—Neutral Sodium Myristate (Curve M), Oleate (Curve O), Palmitate (Curve P) and Stearate (Curve S) against Oiled Soil at 60° C. in Experiment 7.

Experiment 10.—It seemed worth while to test the effect of adding a fat-solvent to soap solutions in the low-temperature washing of greasy stains. Tubes of 0.1 Normal sodium oleate were left in the bath at 35° C. for one-half hour. Then one cc. of a fat-solvent was added, the stoppered tubes were vigorously shaken one minute, and then returned to the bath for one-half hour before the wash was started. The results are also given in Table 1.

Experiment 11.—For comparison with the results of Experiment 10 it seemed necessary to run some tests with solvents alone, without soap solution. These were done at room temperature, about 26° C. The wash period was eight minutes and the rinse four minutes, with thirty cc. of solvent in each tube. The results are also given in Table 1.

Experiment 12.—Dry-cleaning soap[1] was prepared from sodium hydroxide and excess oleic acid and 0.2 per cent of it was added to petroleum ether for the washing medium, but none in the rinse. The results are given in Table 1.

[1] Bureau of Standards Technologic Paper No. 322.

Sew Slips

Experiment 13.—Soiled slips were sewed to white duck pants as in the detergent experiments on goods soiled with carbon black and these were sent to the power laundry as usual. The results are given in Table 1.

The most powerful washing effect in the laboratory was accordingly obtained when sufficient of an appropriate fat-solvent was added to aqueous soap.

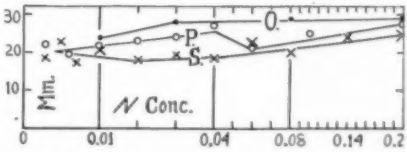

Figure 9.—Neutral Sodium Oleate (Curve O), Palmitate (Curve P) and Stearate (Curve S) against Oiled Soil at 80° C. in Experiment 8.

Summary

Cotton fabric was soiled with an ointment of lamp black and vaseline, lard, or medicinal mineral oil. After washing in a special machine, the residual soil was evaluated by a colorimeter used as a reflectometer.

Of pure sodium laurate, myristate, palmitate, stearate and oleate, the latter was the most powerful up to 40° C., while palmitate took first place at 60° C. and stearate at 80° C. Addition of sufficient appropriate fat-solvent enhanced detergent power.

In parallel with the writer's findings on emulsification, excess fatty acid enhanced detergent power while excess alkali decreased it. Other resemblances between emulsification and detergency were not distinct.

TABLE 1
Results of Experiments 9 to 13

Experiment	Vehicle of Soil	Washing Medium	Colorimeter Readings[1]	
9	Vaseline	Neutral gelatin solution.....	21.0	
			23.5	22.0
10 (a)	Vaseline	Neutral oleate, alone.....		21.5
10 (b)	Vaseline	Oleate plus cresol, U. S. P.	19.5	18.5
			17.5	
10 (c)	Vaseline	Oleate plus carbon tetrachloride.....	9.0	
			7.5	8.5
10 (d)	Lard	Neutral oleate, alone.....	17.0	
			17.0	17.0
10 (e)	Lard	Oleate plus carbon tetrachloride....	12.0	
			12.0	12.0
11 (a)	Vaseline	Carbon tetrachloride, alone.....	24.0	
			21.0	22.5
11 (b)	Vaseline	Petroleum ether, alone.....	26.5	
			23.5	24.5
12	Vaseline	Petroleum ether plus dry-cleaning soap	23	
			19	21.0
13 (a)	Vaseline	Power laundry[2]		10
13 (b)	Lard	Power laundry[2]		14.5
13 (c)	Oil	Power laundry[2]		18.5

[1] Each pair of readings in the first column represent duplicate slips, not merely the two sides of a single slip.
[2] Sent on different dates.

Value of Linseed Production Decreases 20.8 Per Cent

The Department of Commerce announces that, according to data collected at the biennial census of manufacturers taken in 1928, the establishments engaged primarily in the manufacture of linseed oil, cake, and meal in 1927 reported a total output valued at $111,234,271, of which amount $73,367,776 represents linseed oil; $32,073,890, linseed cake and meal; and $5,792,605, other products, consisting chiefly of oils other than linseed. The rate of decrease in the total value of products as compared with that for 1925, the last preceding census year was 20.8 per cent.

The statistics refer only to the output of those establishments which were engaged primarily in manufacturing or refining linseed oil for the trade, and do not, therefore, cover the value of such oil made and consumed by the same establishments in further processes of manufacture—for example, in the manufacture of paint and of linoleum. According to the returns from the Census Bureau's quarterly canvass of producers of animal and vegetable fats and oils, the total output of linseed oil during the calendar year 1927, including that made and consumed in the same establishments, amounted to 776,714,498 pounds, or 103,561,933 gallons. The corresponding total for 1925 was 763,882,379 pounds, or 101,842,983 gallons.

Of the thirty-two establishments reporting at the biennial canvass for 1927, seven were located in Minnesota, six in New York, five in Illinois, three each in New Jersey and Wisconsin, two each in California and Ohio, and the remaining four in Iowa, Kansas, Oregon and Pennsylvania. In 1925 the industry was represented by thirty-three establishments, the decrease to thirty-two in 1927 being due to the fact that one establishment was reported as idle during the entire year. The 1927 figures are preliminary and subject to such correction as may be found necessary after further examination of the returns.

Mayonnaise Producers Co-operate

Rigid Requirements Established for Mayonnaise Oils

AN informal meeting of The Mayonnaise Products Manufacturers Association of America, Inc., to discuss various matters of moment, was held in Chicago early this year. Representatives of 75 manufacturers of Mayonnaise and its allied industries were present.

The meeting was a real live and snappy one, president C. P. McCormick presiding and executive secretary N. Alan LeSavoy assisting.

Freight Rate Fund

Among the matters discussed was the attitude of the association in regard to the proposed changes in freight classification of all food products packed in glass, especially where these changes might affect the Mayonnaise industry. A motion was carried to assess each of the members and to solicit contributions from Mayonnaise manufacturers who may not be members of the association, towards the establishment of a fund with which to actively combat any freight classifications from a lower to higher rate. The Transportation Committee, Julius Adler of the Sar-A-Lee Company, chairman, was instructed to take the matter in hand and to keep the association posted as to the progress they were making.

Mr. Miedel, of the Hazel-Atlas Glass Company, also member of this committee, volunteered his active participation, and informed those present that the Glass Container Association would back us to the limit.

Mr. H. W. Madison, of the Widlar Company, Cleveland, Ohio, was made a member of this committee.

The committee working on standards and research reported progress. However, the government, after considering the proposed standard set up by the association, made some changes, which after much discussion were deemed not to the best interests of the industry and it was decided to recommend that the committee again petition the government for the allowance of the 2% stabilizer as originally set forth, instead of the ½ of 1% which the government recommended and published.

Print One Booklet

The committee on booklet recommended that instead of two (2) distinct booklets being printed, that one be printed, incorporating the facts about Mayonnaise and its uses in easily understood English, and a more technical treatise for the medical profession and dietitians to be also incorporated under the same cover.

The full report of the Standards and Research Committee, Mr. Dan Gray, chairman, follows:

"At the recent meeting of the Standard and Research Committee in Chicago, the following matters were discussed:

First: The progress on the pamphlet.

Second: Question of the proposed government standard for Mayonnaise.

Third: The possible use of alginates as stabilizers for Mayonnaise.

Fourth: The possibility of using a colloid mill to make a more stable emulsion.

Fifth: Discussion of the research problem for which the association at its last meeting appropriated $2,500.00.

Sixth: Progress made in co-operative research with various government bureaus.

Seventh: Conference with Cotton-seed oil producers regarding acidity limits and Kreis Test.

Prior to the January meeting of the Standard and Research Committee, Sub-committee No. 3—which has charge of the pamphlet work—met and discussed the progress made thus far.

Accept Glassford Article

Dr. Glassford read a write-up which he had prepared for the pamphlet and the other members of the Sub-committee, after making a few minor corrections, were of the unanimous opinion that the material was written in a very clear and understandable form and should be incorporated in the booklet together with numerous recipes involving the use of Mayonnaise.

In the regular meeting of the Standards & Research Committee, the material which Dr. Glassford has prepared was read again and approved. A tentative dummy of the pamphlet was furnished by the American Lithographing Company of New York and also a tentative dummy in colors, which contained some very good ideas, although it was decided to modify a number of points in this dummy.

By a vote of the committee, it was decided that two booklets should be prepared in the place of one booklet incorporating both the popular and technical information. This was considered advisable for the reason that the popular booklet is to be printed on a high grade of paper and to contain a considerable amount of color work. This will naturally run the cost up somewhat.

Half Million Needed

The committee was told by one lithographing concern that the cost of this booklet would run approximately 6c a piece on an order of one half million. This popular booklet is intended to go to the housewives and cooks throughout the country, and besides giving them a little non-technical information concerning the value of Mayonnaise in the diet, its nutritive properties and vitamin content, it is thought to be advisable to include in it a number of reliable recipes involving the use of Mayonnaise, so that the booklet will have a utility appeal and will be kept in the kitchen cabinet or with other cook books.

It is estimated that approximately one half million of these popular booklets will be required and it is the opinion of the committee that every member of the association, at the proper time, should contract for the amount of booklets that he contemplates using.

It will also be possible for each member of the association to have his name and location on the back of the pamphlets which he distributes.

With regard to the second pamphlet, it was the consensus of the opinion of the committee that this should be an entirely separate pamphlet printed in black and white on a plainer type of paper, as is the custom with technical pamphlets.

It was estimated that in quantities of 100,000 this technical pamphlet, in black and white on a reasonably good grade of paper, could be gotten out at a cost around 1c each.

Omit Technical Data

It is obvious, therefore, that it would be poor economy to make up one booklet containing the recipes and popular information along with the technical information, as the expensive pamphlet would have to be sent to parties interested only in the technical aspect of Mayonnaise. In other words, we would be sending a 6 or 7c pamphlet where a 1c pamphlet would do.

The committee felt that best results could be obtained by sending copies of the pamphlet to the leaders of 4-H clubs throughout the country. There are approximately 40,000 such clubs, and the leaders of these clubs are all college graduates who have had more or less chemistry, nutrition and dietetics. The technical pamphlet would be readily understandable to them. In fact, it would be written in such a manner as to appeal to this class.

The committee also plan to place one of these pamphlets in each library of the country and also to place them at the disposal of Domestic Science Teachers. A total of approximately 100,000 technical pamphlets would therefore be required.

If 100,000 pamphlets costing 1c each were distributed and 2c a piece was allowed for distribution, the total outlay for the distribution of these 100,000 pamphlets would amount to $3,000.00. If, on the other hand, this same technical information was sent to the same persons in combination with the more expensive popular pamphlet, the total cost, including distribution, would be approximately 8c a piece, or a total cost for 100,000 pamphlets of $8,000.00. In other words, the association would be throwing away $5,000.00, which, in the Research & Standards Committee's opinion, it could ill afford to do.

Therefore, in spite of the fact that the association as a whole voted to have one pamphlet combining the popular and technical features, the Research Committee feels that this matter should be reconsidered and the final loss involved be taken into account.

The American Lithographic Company have advised us that in case they received this contract, the service of their Domestic Science Expert, Miss Sara Field Splint, would be available for the writing of the pamphlet and general supervision of the subject matter, without additional cost.

Standards Committee Points

With regards to the tentative standards issued by the Food Standards Committee of the Department of Agriculture, there were a number of points which the committee agreed should be altered if possible.

First, the committee recommended that the minimum oil content should be reduced from 60% to 50%.

Second, the committee recom-

mended that the use of any edible acid be permitted, such as tartaric, malic, lactic, etc., acids.

Third, the committee recommends that the amount of stabilizer permitted, be increased from ½% to 1%.

Fourth, the question of the exclusion of artificial coloring materials or preservatives was considered, but it was thought useless to take this matter up again with the Food Standards Committee since it is not at all reasonable to think that they would make an exception in Mayonnaise when all other food products are permitted the use of artificial coloring and preservatives, provided both of these materials are declared on the label.

Revised Standard

In the opinion of the committee, the revised standard should therefore read—

"Mayonnaise, Mayonnaise Dressing and Mayonnaise Salad Dressing is the clean, sound emulsified product, composed of edible vegetable oil, egg yolk or whole egg, a vinegar and/or lemon juice and/or other edible acids, with or without one or more of the following: Salt, other condiments, sugar, edible stabilizing material. In its preparation are used not less than 50% of vegetable oil and not less than 6% of egg yolk solids contained in commercial egg yolk, dried egg, dried egg yolk or whole egg. In the finished product, the sum of the percentages of vegetable oil and fresh egg yolk free from white, is not less than 78% and the quantity of any stabilizing material used does not exceed 1%."

This changed standard was O.K.'d by the members of the association at their meeting Tuesday morning, January 24.

Use of Alginates

The possibility of using a newly developed class of compounds, called alginates, as stabilizing materials in Mayonnaise has recently come to the attention of the Research Committee. The Committee has been in touch with a concern making these products and at the recent meeting discussed the possibility of their use in Mayonnaise with a representative of the firm manufacturing these compounds. This concern has agreed to do some research work in co-operation with the Research Committee to determine if the alginates can be used in Mayonnaise with any benefit. The problem of the separation of the Mayonnaise emulsion, either due to temperature changes or transportation, is of course a serious problem and the committee thought that alginates might be used successfully as stabilizers.

Dr. Glassford has very kindly offered to make a few preliminary experiments to determine whether or not the alginates offer any promise in this direction, and if his experiments indicate that their use is promising, the concern manufacturing them will begin their research work.

With a view to overcoming the trouble of separation due to temperature changes and transportation, the Research Committee thought that a Mayonnaise made in a colloid mill might offer some improvement and were, therefore, able to induce a manufacturer of colloid mills to do some research work in co-operation with the committee with a view to determining

whether Mayonnaise prepared in a colloid mill was more resistant to low temperatures than Mayonnaise made in the ordinary manner.

The Research Laboratories of the colloid mill concern submitted several samples of Mayonnaise made up using the colloid mill. One of these samples had been subjected to a very low temperature and thawed out again with no apparent separation. The committee is planning to continue this co-operative research with the manufacturer of the colloid mill in the hope that they will be able to report something of interest to the association before long.

Research Appropriation

At the October meeting of the association, the Research Committee was granted an appropriation of $2,500.00 to conduct research on a problem which was considered of fundamental importance to the Mayonnaise industry. The committee, at that time, had several problems in mind and it was a question of deciding which one was the most important.

This matter has not been actively prosecuted up to the present time as it was thought best to concentrate the efforts of the committee in turning out the pamphlet.

However, Sub-committee No. 4—consisting of Mr. Collins, Dr. Kurnik, Dr. Glassford—discussed this matter at the recent meeting and rendered it as their opinion that no research work, calling for the expenditure of the $2,500.00 appropriation, be undertaken at present. This matter will be taken under further advisement by Sub-committee No. 4.

It is not the intention of the Research Committee to give out the impression that there are no problems confronting the Mayonnaise industry requiring research, but merely that these problems are of such magnitude that it is rather difficult to decide upon which one the appropriation of $2,500.00 could be used with the greatest returns.

The Standards & Research Committee has a program of co-operative research with the various government research bureaus by which we hope to be able to get some valuable research work undertaken by the various government bureaus on such subjects as the Vitamin Content of Egg Yolk, problems relating to oils, etc.

As Mr. Winckelman, foreman of Sub-committee Two in charge of this division of activities, was not present at the meeting, we are not able to make a report on this phase of the work.

Meeting with Oilmen

At the October meeting of the Association, a number of the producers of Cottonseed Oil strenuously objected to furnishing cottonseed oil having free fatty acid content not to exceed .05% and an oil giving a negative Kreis Test. It was suggested by them at that time that they confer with the Standards & Research Committee of the Association at a later date to see if this question could be worked out to the mutual agreement of both the oil manufacturers and the Mayonnaise manufacturers.

Accordingly, a conference was held between the Research & Standards Committee of the Mayonnaise Association and a committee of the Cottonseed Oil Refiners to which any one interested was in-

vited. The following registered at this conference which was held early in the year, in the rooms of the Standards & Research Committee.

G. A. Wiggin, Procter & Gamble, Cincinnati, Ohio.

C. P. McCormick, McCormick & Co., Baltimore, Md.

N. Alan LeSavoy, The Gelfand Manufacturing Co., Baltimore, Md.

A. K. Epstein, Epstein, Reynolds & Harris, Chicago, Ill.

C. J. Woeber, Woeber Mustard Manufacturing Co.

Roy C. Newton, Swift & Company.

John E. Cain, Boston, Mass.

H. O. Rinne, Southern Cotton Oil Company.

E. L. Reinke, Southern Cotton Oil Company

J. P. Doyle, Southern Cotton Oil Company

M. C. Reynolds, Emulsol Corporation, Chicago, Ill.

Louis Rosenstein, Aspegren & Co., Inc., New York

Ben Radskin, Aspegren & Co., Inc., New York

J. W. Johnson, Maury-Cole Co., Memphis, Tenn.

F. W. McKee, Van Camp Packing Co., New York

H. H. O'Shea, Van Camp Packing Co., Louisville, Ky.

W. R. Collins, Horton-Gato Manufacturing Co., Detroit, Mich.

Wm. H. Ritter, Jr., P. J. Ritter Co., Philadelphia, Pa.

Dr. John Glassford, McCormick & Co., Baltimore, Md.

D. M. Gray, Hazel-Atlas Glass Co., Wheeling, W. Va.

The committee of the cottonseed oil refiners submitted the tolerances upon which they had agreed. The points of contention were:

First, that they set a limit of 0.10% free fatty acids.

Second, they made no mention of the Kreis Test, which test, they maintain, is not reliable.

The discussion over these two points lasted for several hours, during which the views of both sides were thoroughly aired. The Oil Manufacturers apparently failed to take cognizance of the fact that the oil in Mayonnaise is subjected to very severe conditions, namely—moisture, air, acid, light, bacteria and enzymes from the egg yolk material. For these reasons, the Standards & Research Committtee feel that the best oil obtainable is none too good for Mayonnaise, while the oil producers claim that these standards are too rigid and while they furnish oil within limits of 0.05% free fatty acids most of the time, there is a possibility that the free fatty acids may run as high as 0.10% at certain seasons and they do not wish to be in danger of having the oil refused on this account.

Arbitration Board

During this discussion, it was proposed to establish a Board of Arbitration composed of three members of the Mayonnaise Association, to be chosen by President McCormick, and three members of the Cotton Oil Refiners Association, together with a seventh member mutually agreeable to the two groups, to be appointed in case of a deadlock.

This Board of Arbitration is to settle cases of dispute between producers of oil and manufacturers of Mayonnaise, arising over a difference of opinion as to whether or not the oil meets specifications set forth in the particular contract between oil producers and Mayonnaise manufacturers.

If the question of dispute is one

involving chemical analysis, the Arbitration Board will retain the services of competent analysts or chemists, mutually agreeable to both sides, who can examine the disputed shipment of oil and determine whether or not it conforms to specifications set forth in contract.

With a view to coming to some definite decision regarding the matter of free fatty acids and the Kreis Test, the Standards & Research Committee withdrew from the conference for a short time and held a caucus during which the following resolution was adopted:—

"The Standards & Research Committee of the Mayonnaise Products Manufacturers Association of America wishes to advise the Committee representing the manufacturers and refiners of cottonseed oil that the oil best suited for the manufacture of Mayonnaise should:

1. Contain not more than 0.05% free fatty acid.
2. Give a negative Kreis test.
3. Be of sweet and neutral taste and flavor.
4. Comply with the A.O.A.C. cold test.

The Research Committee wishes to pass this recommendation on to the members of the Mayonnaise Association and inform them that this recommendation was drawn up after due and careful reconsideration of the question of oil standards, and that in their opinion, any manufacturer of Mayonnaise is unnecessarily exposing himself to financial loss if he uses oil which does not come within these specifications.

This is, of course, merely the recommendation of the Standards and Research Committee, and is in no way binding upon the members of the Association, but the Committee strongly urges that all members of the Association contract for their oil under these specifications."

There was a short meeting of the Board of Directors, who passed on the proposed standard to be submitted to the Government Committee. The association was pleased to welcome into its fold three new members.

Chemical Firm Changes Name

The name of the Industrial Chemical Company, New York, has been changed to Industrial Chemical Sales Company, according to an announcement made by Noel Statham, president, on June 6. The organization of the concern remains the same, the only difference being in the name.

Lowe Joins Boiler Company

Charles O. Lowe, who was formerly with the American Salad Oil Company, has joined the chemical staff of Babcock & Wilcox, manufacturers of industrial, domestic and marine boilers. Mr. Lowe will be stationed at Bayonne, New Jersey, where he will work on the relation of water characteristics to boiler design.

Corrections

Readers of OIL AND FAT INDUSTRIES have called our attention to two errors in the June issue. In the story of the New Orleans convention it was stated that a moisture oven with a standard temperature of 102 C. had been adopted by the society. The temperature should have read 101 C.

The article on "Referee Applicants," page 170, stated that W. J. Bramblett of the Texas Testing Laboratories, is at Fort Worth. He has informed us that he is at San Antonio, Texas, instead of Forth Worth.

The American Oil Chemists' Society

Notes and Correspondence

Standardization of Lovibond Glasses

(Investigation in Cooperation with the American Oil Chemists' Society)

Report for May, 1928

By IRWIN G. PRIEST

1. *Investigation of Sixty-five 35-Y Glasses Submitted by A.O.C.S. August*, 1927.

Considerable further progress has been made in preparing the report on this investigation. (Priest).

2. *Further Calibration of Red Glasses in Bureau of Standards Set, B. S.* 9940.

(Cf. Sec. III of Report for April.)

Three more glasses (maker's marks, 0.08, 1.0, and 5.6) in Bureau of Standards Set, B. S. 9940, have been carefully re-examined by direct color comparison with other glasses in the same set. The following table summarizes the results of a large number of observations by two observers:

Lovibond Red Numerals

(1) As engraved by the maker (N)	0.08	1.0	5.6
(2) As computed directly from spectral transmission by method of Priest and Gibson (N")	0.154	1.17	6.16
(3) As found by direct color comparison with other glasses in same set:			
(a) Assuming the N" values of Priest and Gibson for these other glasses	0.146	1.22	6.21
(b) Assuming the N" values of Judd and Walker for these other glasses. (Cf. Sec. III of Report for April, 1928).....	0.152	1.21	6.25

(Judd, Walker)

A study of the relation between transmissions of the glasses for certain particular wave lengths and the numerals assigned by Priest and Gibson has been begun. Log $\frac{T}{T_{590}}$ has been plotted against N" for wave lengths 570, 560, 550, 540, 530, 500 where T 590 is transmission for wave length 590 and T is taken in turn as the transmission for the above mentioned wave lengths. (Priest, Riley).

3. *Construction of Instrument for Using the Lovibond Glasses.* (*Cf. Sec. IX of Report for March*, OIL AND FAT INDUSTRIES, *p.* 156, *May*, 1928.)

The mounting for the glasses (item 2 in Sec. IX of Report for March) was nearly finished about May 1st. Since then, an improvement permitting of more convenient reading of the scales has been designed. This consists of an adjustable mirror mounted so that the Lovibond numerals indicating the setting can be set by the observer without his leaving the ocular. This addition to the instrument is now being constructed.

Considerable work in detailed design and construction remains to be done in order to complete and perfect the arrangement for color grading oils. This mounting for the glasses must be combined with a Martens photometer, a source of artificial daylight, and a mounting for the oil sample. The principal task in this is the careful design of lenses and biprisms to direct the light through the oil sample and the glasses in such a way as to give a perfect photometric field in the Martens photometer. (Priest).

4. *Preparation of Paper on Effect*

of Temperature on Color of Lovibond Glasses.

A preliminary draft of paper describing the investigation mentioned in the Report for March (Sec. II, OIL AND FAT INDUSTRIES pp. 152-153, May, 1928) has been prepared. (Judd).

5. *Tests of Color Sense Conducted for the American Oil Chemists' Society at New Orleans.*

The principal work of the month has been the tests of color sense conducted at the request of the A.O.C.S.

These tests were undertaken at New Orleans in connection with the A.O.C.S. Convention. The tests consisted of three kinds as follows:

(1) The Ishihara test.

(2) Test of ability to perceive small differences in Lovibond red at 35-Y, 7.6R on the Lovibond scale. (An improvement and extension of the method described in OIL AND FAT INDUSTRIES, pp. 63-73; March, 1928.)

(3) The color grading of six samples of oil in the manner and with apparatus usually employed by the oil chemists, but with standard glasses supplied by the Bureau.

46 Tested

These tests were conducted by I. G. Priest and B. Judd, representing the Bureau of Standards, and Geraldine K. Walker, representing the A.O.C.S. They were very effectively assisted by a number of volunteers in behalf of the A.O.C.S. By having several persons take turns in conducting the tests, it was possible to test forty-six applicants in a formal systematic manner.

Just prior to the New Orleans Convention and in preparation for it, a number of individuals at the Bureau were tested in regard to their ability to perceive differences in Lovibond red. These data will also be supplemented by other data obtained at Washington since the Convention.

The report upon these tests is now being prepared. (Priest, Judd, Walker).

6. *Reports to A.O.C.S. at New Orleans Convention.*

Oral reports on progress of the cooperative work by the Bureau and the A.O.C.S. were made to the Convention May 15th, by Mr. Priest and Miss Walker.

Routine Work Progress

7. *Progress on Routine Calibration of Red Glasses Submitted by A.O.C.S.*

Work on routine calibration has been delayed several weeks by reason of attention given to color sense tests and also by illness of the research associate in charge of it. For these reasons, this work was practically suspended during the latter three-quarters of May.

Twenty-nine glasses submitted April 14th have been calibrated and returned.

Twenty-four red glasses submitted May 3rd have been calibrated and returned.

Twenty-five red glasses were submitted May 14th.

Twenty-five red glasses were submitted May 31st.

One glass submitted May 3rd (in addition to those mentioned above) was found to bear same number as another glass previously reported (A.O.C.S. 342). This number has been effaced and this glass has been marked A.O.C.S. 500 as per instructions from Mr. Putland. (Walker).

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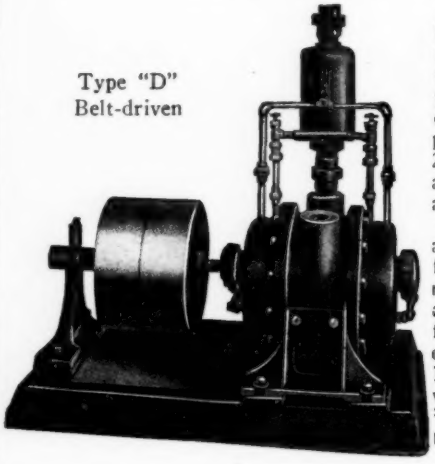

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